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UNCLASSIFIED - INFORMATION ON SOVIET BLOC INTERNATIONAL GEOPHYSICAL COOPERATION -1959

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INTERNATIONAL GEOPHYSICAL COOPERATION PROGRAM -- SOVIET-BLOC ACTIVITIES

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I. ROCKETS AND ARTIFICIAL EARTH SATELLITES

USSR Launches Third Cosmic Rocket; To Fly Around Moon

The following is a translation of the Tass report announcing the launching of the third Soviet cosmic rocket.

"In accordance with the program of investigations of cosmic space and preparations for interplanetary flights, the launching of a third cosmic rocket was successfully accomplished in the Soviet Union. An automatic interplanetary station was installed on board the rocket.

"The launching was realized with the aid of a multistage rocket. The last stage of the rocket, having attained a given velocity, injected the automatic interplanetary station into the required orbit.

"The orbit of the automatic interplanetary station was selected so as to ensure the passage of the station near the Moon and to fly around the Moon.

"The automatic interplanetary station will pass by the Moon at a distance of about 10,000 kilometers and, having rounded the Moon, will, in its further motion, pass in the region of the Earth. The orbit selected ensures the possibility of observing the station from the Earth's northern hemisphere.

"The last stage of the third Soviet cosmic rocket weighs 1,553 kilograms (less fuel).

"The automatic interplanetary station was placed in the rocket's last stage. After entering orbit, the station was separated from the rocket. The rocket's last stage is moving in an orbit close to the station's orbit. The automatic interplanetary station is intended for extensive scientific investigations in cosmic space. Scientific and radio apparatus and also a system for automatic regulation of the heat regime were installed in the station. Power supply for the scientific and radio apparatus on board is provided by solar batteries and chemical sources of current. The station's total weight is 278.5 kilograms. In addition, measuring apparatus with a source of power weighing 156.5 kilograms is located in the last stage of the rocket. Thus, the total weight of the payload is 435 kilograms.

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"Transmission of scientific information and the results of measurements of the parameters of the automatic interplanetary station's motion will be accomplished with the aid of two radio transmitters operating on frequencies of 39.986 and 183.6 megacycles. Checking of the elements of the orbit of the interplanetary station will be performed simultaneously through a radio link with a frequency of 183.6 megacycles.

"The signals of the transmitter on the 39.986-megacycle frequency are pulses of variable duration from 9.2-0.8 seconds. The pulse repitition rates are 1±0.15 cycles per second.

"Transmission of information from the automatic interplanetary station will be made intermittently, for 2-4 hours daily, in accordance with the program of observations. Control of the operation of the apparatus on board the automatic interplanetary station is being maintained from the tracking centers on Earth.

"Measurement of the rocket's parameters is accomplished by an automatic complex, the ground stations of which are located at different points in the Soviet Union.

"Broadcasts on the movement of the third cosmic rocket will be carried by all radio stations of the Soviet Union.

"The routine communication of the operation of the radio technical apparatus begins on 4 October at 1300 hours Moscow time. At this time, the rocket will be over a point in the Indian Ocean with the coordinates 80 E, 5 S, at a distance of 108,000 kilometers above the Earth. Communication of the operation of the radio technical apparatus will last about 2 hours.

"Radio observations of the rocket will be conducted from the territories of Europe, Asia, Africa, and Australia.

"The launching of the third Soviet cosmic rocket and the creation of the automatic interplanetary station will make it possible to obtain new data on cosmic space and is a further contribution of the Soviet people in international cooperation in conquering the cosmos." ("On the Launching of the Third Cosmic Rocket in the Soviet Union"; Moscow, Pravda, 5 Oct 59, p 1)

Information From Daily Bulletins on Third Cosmic Rocket

The third Soviet cosmic rocket launched on the morning of 4 October, the second anniversary of the launching of Sputnik II, is reported to be at a distance of 145,000 kilometers from the Earth over a region in the Atlantic Ocean whose coordinates are 5 48 E and 8 36 S at 1800 hours Moscow time.

The processing of the data of measurements of the parameters of the rocket's trajectory has confirmed the accuracy with which the rocket was injected into its orbit. Complex scientific measurements will be conducted during the entire flight and transmitted during earlier calculated intervals to tracking stations on command.

The first communication, conducted on 4 October, lasting 2 hours, confirmed the normal operation of the all of the station's instruments, the power sources, and the measuring and transmitting apparatus. The data of this transmission is being carefully processed. The next contact will be made on 5 October.

At 1200 hours, 5 October, the third cosmic rocket is reported as being at a distance of 248,000 kilometers from the Earth over a point in the Indian Ocean with coordinates of 14 20 S and 98 E. The third cosmic rocket was given an initial orbital velocity somewhat less than the second cosmic velocity [11.2 kilometers per second] to ensure its flight around the Moon and its subsequent return toward the Earth.

The automatic interplanetary station, separated from the last stage of the rocket, will be closest to the Moon at 1700 hours on 6 October, having covered the distance from the Earth to the Moon in about 2 1/2 days. At this time, the station will be about 7,000 kilometers from the Moon's surface.

The apparatus is reported functioning in accordance with the fixed program of scientific investigations.

The second transmission from the station will be conducted from 1500-1700 hours on 5 October.

At 2000 hours Moscow time on 5 October, the third cosmic rocket was over the Atlantic Ocean at a point with coordinates of 20 40 S and 21 30 W and at a distance of 284,000 kilometers from the Earth.

The rocket is reported as moving precisely according to the assigned orbit.

According to the results of a preliminary processing of the data of the telemetric measurements obtained on 4 October in the second transmission of measurements, it was established that the temperature regulating systems, the power sources, and the scientific apparatus on the automatic interplanetary station are functioning normally.

On 5 October, from 1500-1700 hours Moscow time, on command from a ground station, the data of the telemetric measurements was transmitted by the station and was recorded on tape by ground stations.

The next transmission from the station will be conducted on 6 October from 1700-1900 hours Moscow time. ("Rocket in Motion"; Moscow, Izvestiya, 6 Oct 59, p 1)

About 2000 hours on 6 October, the third Soviet Cosmic rocket was over the Atlantic Ocean, northeast of the Island of Martin Vaz, over a point whose coordinates are 22 48 W and 17 30 S, at a distance of 371,000 kilometers from the Earth.

Passing at its closest distance from the surface of the Moon, 7,000 kilometers, the rocket continued its movement, rounding the Moon. The distance from the surface of the Moon at 2000 hours on 6 October was 15,000 kilometers. The rocket at this time was near the plane of the lunar equator and had a selenographic longitude of 137 degrees and a latitude of minus 12 degrees.

The motion of the rocket is reported to be continuing according to the given orbit.

According to the results of the preliminary processing of the data of the telemetric measurements in the second and third transmission, the temperature on board the automatic interplanetary station is being maintained up to the limits of 25-30 degrees and the pressure at about 1,000 millimeters of mercury, which corresponds to the assigned values.

The apparatus for scientific measurements, the solar batteries and the chemical power sources are reported functioning normally.

The next transmission of the data of scientific measurements and the measurements of coordinates will be made at 1800 hours Moscow time on 7 October. ("Rocket in Motion"; Moscow, Izvestiya, 7 Oct 58, p 1)

At 2000 hours on 7 October, the third Soviet cosmic rocket, continuing its motion, is in the constellation of Serpens near the star Zeta Serpens, with a declination of minus 11 degrees 36 minutes and a right ascension of 16 hours 31 minutes 37 seconds.

According to calculations conducted in the coordination-computer center, it has been determined that the station is continuing to move exactly according to the planned orbit.

The interplanetary station is reported to be moving farther away from the Earth and the Moon. About 2000 hours on 7 October, the station's distance from the Moon was 126,000 kilometers, and from the Earth, 417,000 kilometers.

The station will continue to move farther away from the Earth, reaching its maximum distance, equal to 470,000 kilometers, on 10 October. Then the interplanetary station will begin to approach the Earth and will pass by it in a north-south direction on 18 October. The station, at its closest point of approach will be at a distance of 40,000 kilometers from the Earth's surface.

According to the 6 October transmission of data from the station, all is still functioning normally on board.

The next transmission will occur on 8 October from 1700 to 1800 hours Moscow time. ("The Rocket in Motion"; Moscow, Izvestiya, 8 Oct 59, p 1)

Life on Moon May Exist Says Soviet Astrobotanist

There is basis to suppose that the lowest forms of life exist near the edge of the lunar disc in the crater of Plato and possibly in regions on the opposite side of the edge of the visible part of the Moon, says G. Tikhov, chief of the Sector of Astrobotany, Academy of Sciences Kazakh SSR and Corresponding Member of the Academy of Sciences USSR.

Tikhov further said that he foresees the day, not too distant, when a Soviet interplanetary laboratory will appear in the direct neighborhood of Mars and will finally help in establishing with certainty the presence of life on this planet.

The scientific research institute of astrobotany has already been operating under the Academy of Sciences of the Kazakh SSR for 12 years, according to Tikhov. Soviet science first proposed the possibility of the existence of a plant world on the Moon, he says. He feels the time has now come to expand the investigation of the possibility that life exists on other planets.

Tikhov says that despite his 84 years, he is full of hope of living until that happy day when all that to which he has devoted himself, creating a science about life on other planets, will be directly confirmed with the aid of Soviet cosmic ships. Perhaps; he continues, the foot of Man will soon tread on the Syrtis Major of some other spot on Mars. ("Next is Mars," by G. Tikhov; Moscow, Pravda, 6 Oct 59, p 2)

Space Rocket III Data Will Aid Future Manned Flights

The third cosmic rocket will make it possible to obtain that information which is extremely necessary for launching more refined cosmic ships and finally, the flight of the first space flyers, says N. P. Barabashev, Academician of the Academy of Sciences Uzbek SSR and chairman of the Commission for the Investigation of Physical Conditions on the Moon and Planets of the Astronomical Council of the Academy of Sciences USSR. ("The Second Hemisphere of the Moon is being Investigated," by N. P. Barabashev; Moscow, Sovetskaya Aviatsiya, 6 Oct 59, p 2)

Satellite Observations at the Kazakh Astrophysics Institute

The observatory of the Astrophysics Institute of the Academy of the Academy of Sciences, Kazakh SSR, is located in the foothills of the Zailiyskiy Alatau mountain chain, at an altitude of 1,450 meters above sea level, 12 kilometers from the city of Alma-Ata. The clean mountain air and the large number of clear nights per year contribute to the fruitfulness of the astronomical observations.

The scientific work of the institute is extremely varied. Soviet scientists, under the guidance of Academician V. G. Fesenkov, study the stars and the interstellar medium, the planets and the interplanetary matter which causes Zodiacal light, the Sun and the optical properties of the Earth's atmosphere. With the launching of the first Soviet artificial Earth satellite, new problems confronted the astronomers of the observatory and all other astronomers of the Soviet Union. These "celestial bodies," moving rapidly against the background of the star sky, required the mastering and further perfection of methods of optical observations which were original and unusual for planetary and stellar astronomy. How these observations were made at the Institute are described by V. S. Matyagin and A. V. Kharitonov, Scientific Associates of the institute.

Observations of artificial Earth satellites are conducted for determining the orbit in which they move and the moment of time they are located at any point along this path. These observations are characterized by the accuracy of two types of obtained values: the first, the visible position of the satellite on the background of the star sky determined by celestial coordinates, and the second, the moments of time to which the measured coordinates pertain.

Visual observations of the artificial Earth satellites were made at the observatory with theodolites (for Sputnik I's carrier rocket) and by the so-called "barrier method," employing the use of a large number of telescopes sighted at the sky so that their fields of view (overlapping one another) form a long arc located near the expected passage of the satellite and at right angles to its motion.

Neither of these two methods gives the desired accuracy. Such observations usually result in errors, in determining the position of a satellite, of several tenths of a degree, and in determining the moments of time, from 0.1-0.5 seconds. Observations of such low accuracy can be used only for a rough calculation of the orbit but are not suited for the solution of other problems.

Much greater accuracy in determining the positions of satellites is given by photographic methods. These are much more difficult than the visual methods. In photographing, use is made of obturators placed before the camera's objective or of high-speed shutters for creating breaks in the satellite's trail for time determinations.

One of the first photographs of Sputnik I's carrier-rocket was made in the Soviet Union with apparatus employing an obturator. The obturator is suitable only for small and comparatively short-focus cameras which cannot give high accuracy in determining satellite coordinates.. Time determinations with the obturator are registered with an accuracy not greater than 0.05 seconds.

For increasing the accuracy of determining coordinates, large long-focus telescope-astrographs were used, substituting high-speed shutters for the obturators. With such shutters, the opening and closing time of which is recorded by means of a special device, remodeled "NAFA" aerial surveying cameras were suitable. These cameras are found in many observatories of the Soviet Union, including that of the Astrophysics Institute of the Academy of Sciences, Kazakh SSR. This camera was used for observations of Sputnik II and Sputnik III's carrier-rocket.

However, even high-speed shutters frequently cannot give the required high accuracy. In addition, their construction is complicated, and they cannot be used with all telescopes. A new, constructionally simpler method was developed in the Astrophysics Institute under the joint direction of D. A. Rozhkovskiy, chief of the Division of Astrophysics, and the authors.

The new method is described as follows. The meniscus astrograph of the Maksutov system was used for satellite observations. The diameter of its aperture is 50 centimeters, and its focal length is 120 centimeters. The telescope, having fine optical qualities, gives clear images of stars in photographs by which coordinates can be determined with high accuracy. In addition, a glass plane-parallel plate is placed inside the telescope. The beam of light from the star-sky and the satellite, which is gathered by the telescope, first passes through this plate before falling on the photographic plate. If the plate remains in an unchanged position during photographing, then no particular change occurs in the picture. But one has only to tilt the glass plate at a small angle and all of the images of the stars on the photograph, and consequently, the satellite's trail also, move to one side.

In this apparatus, the plate plays the role of a shutter, not interrupting the light, but by means of slight tilts shifts the images, causing reference marks on the satellite's track. The tilts are made by two electromagnets which attract a steel rocking shaft fastened to the plate. They are switched on automatically. Under the action of these magnets, the plate performs rapid (0.001 seconds) tilts, first to one side and then the other.

Every half second, when the plate remains stationary in one of the extreme positions held there by one of the magnets, the image of the moving satellite traces an unbroken line. At the very moment the plate moves from one extreme position to the other, the satellite's trail is broken, and the images of the stars are doubled. During the satellite's flight through the telescope's field of view from 10 to 25 transfers are completed. Thus, the satellite's trail in the picture has the appearance of a broken line. The positions of the breaks appear very clearly and the moments of time corresponding to them can be easily fixed. For fixing these moments, a separate electric circuit is connected to a loop oscillograph. This instrument is a kind of mirror-galvanometer which records (within 1/10,000th of a second) changes or interruptions of the current in the circuit. A spot of light reflected from the mirror makes a record on a photographic film, which is uniformly moved by a synchronous motor.

When the plate in the telescope occupies one of its extreme positions, the electrical circuit records the time of contact. Thus the oscillograph draws a straight line on the film. But when the magnets are switched on, the time circuit is disconnected during the time required for the plate to move from one extreme position to the other (about 0.01 seconds). Then, short dashes are recorded. The oscillograph simultaneously records time marks of a chronometer with electrical contacts and a quartz printing chronograph.

To determine the moment of time in which any break in the trail occurs, it is only necessary to measure the position of the oscillograph mark on the film relative the nearest time mark and to express this segment in seconds.

This is not all, however. High accuracy is not obtained in recording moments beyond 0.01 seconds of time in noting the transfers of the glass plate from one position to the other. A more rapid transfer is necessary. Here, in addition, the rapid elastic vibrations of the steel rocking shaft which arise and fade are used. These minute vibrations are seen on the satellite's track and recorded on the oscillograph's film. They also make it possible to record the time of the satellite's flight with an accuracy of up to 1/1,000th of a second. The good optical qualities of the telescope make it possible to measure the satellite's coordinates with an accuracy of 0.0005 degrees.

With the aid of this apparatus about 10 photographs of Sputnik II, 6 photographs of Sputnik III, and more than 30 photographs of Sputnik III's carrier-rocket were obtained at the institute. ("How We Observe Satellites," by V. S. Matyangin and A. V. Kharitonov; Moscow, Nauka i Zhizn', No 8, Aug 59, pp 23-25)

Temperature Change in Convective Currents Determined

An indirect method is proposed for studying the origin and development of convective movements in the free atmosphere. The method involves studying the laws governing the change in the temperature and velocity of convective currents with altitude. Highly sensitive thermometers installed on aircraft were used to determine the diameter of convective streams in the plane of the flight and their temperature at the center. These temperature distributions were determined for more than 25,000 convective currents, and a law for the change in temperature along the axis of the streams was derived. ("On the Mechanism of Instability Release in the Free Atmosphere," by N. I. Vul'fson, Institute of Applied Geophysics, Academy of Sciences USSR; Moscow, Doklady Akademii Nauk SSSR, Vol 126, No 6, 21 Jun 59, pp 1244-1247)

III. OCEANOGRAPHY

Vityaz' Begins its 31st Voyage

The Vityaz', expeditionary ship of the Institute of Oceanology of the Academy of Sciences USSR sailed from Vladivostok on 30 September on its 31st voyage of scientific investigations. The ship's course lies to the south in the little-studied waters of the Indian Ocean. The detailed study of this ocean by scientists of the USSR, US, England, France, and the Union of South Africa, according to the IGC program, is beginning.

Chief of the expedition is Prof V. G. Bogorov, director of the Institute of Oceanology and Corresponding Member of the Academy of Sciences USSR. Under his supervision are 11 scientific detachments and groups, each headed by prominent Soviet scientists.

During the 6-month program of investigations, the ship will travel more than 25,000 miles. It will visit the ports of Djakarta, Colombo, Tamatave (Madagascar), and Bombey and will conclude its voyage in Odessa. The ship's captain is I. V. Sergeyev, who has commanded the Vityas' for many years. ("Voyage of the Vityaz"; Moscow, Pravda, 1 Oct 59, p 4)

IV. GLACIOLOGY

Electrometric Method for Study of Glacier Movements

An electrometric method for determining glacier movements, a modification of the charged body method used in electrical prospecting for mapping ore deposits, was tested in 1957 by the Zailiyskiy Glacier Expedition of the Sector of Geography, Academy of Sciences Kazakh SSR.

Advantages of this method are that the total drilling operations are reduced considerably, there is no need for highly-trained personnel, and the instruments used for studying the electrical field are simple, small in size, and easily transported. In addition, results are obtained with sufficient accuracy for solving some of the problems of glaciology. The work was continued during 1958-1959. Methods of bore-hole drilling and bench mark reading were improved.

Experimental work for studying the electrical properties of the ice of the Zaliyskiy Alatau glaciers, conducted under natural conditions, showed that a ratio exists between the value of the current and the voltage, i. e., according to Ohm's law. Specific electrical resistances obtained according to the data of vertical electrical soundings reached 400-500 megohms.

For measuring the velocity of the movement of the ice in the mass of the glacier by studying the electrical field created by electrodes in a bore hole, measurement of the gradient of the potential as the most sensitive to the change in the field is recommended.

On 22 August 1958, a bore hole was drilled in the axial portion of the Central Tuyuksuyskiy Glacier, at a point 600 meters from the end of its tongue and 2,500 meters from the base of the rear walls of the cirque. This point was at an elevation of 3,500 meters above sea level. The bottom moraine was reached at a depth of 52 meters. A string of metallic bars, electrodes with type PVR conductors, soldered to them, was lowered into the bore hole. For preventing the separation of the bar from the power leads, a spiral of this same wire was wound around each electrode, taking its stretching, according to the motion of the glacier, into account.

The electrodes were distributed at depths of 11, 17, 26, 34, 46, and 52 meters from the surface of the glacier. Fifteen platinum resistance-thermometers for measuring the temperatures of the ice at various levels were also placed in the bore hole. In the process of drilling the bore holes, samples of ice for investigating its physical properties were taken. After all of these operations were completed the bore hole was flooded with water and allowed to freeze.

A study of the electrical field from each of the electrodes immediately after lowering them into the ice showed that all the electrodes hung free from the mouth of the bore hole, proving that the bore hole was vertical. For eliminating the effects of a change in the field because of lack of uniformity in driving the receiving electrodes into the surface of the glacier along the direction of its movement, permanent copper markers with insulated copper wire leads were frozen into the ice. This made it possible to fix more accurately the change in the electrical field as a function of the change in the position of the power-fed electrodes in the bore hole.

On 27 February 1959, after 190 days of observations, the following results were obtained through repeated measurements of the electrical fields. In relation to the mouth of the bore hole, the electrodes at the various depths lagged as follows: at the 11-meter depth, the lag was 6 centimeters; at the 17-meter depth, 15 centimeters; the 26-meter depth, 35 centimeters; at the 34-meter depth, 50 centimeters; at the 46-meter depth, 70 centimeters; and at the 50-meter depth, 77 centimeters.

The absolute velocity of the movement of the glacier on the exposed surface at the bore hole for the 190 days of observations consisted of 2.26 meters, whereas the lower surface of the glacier against the bed consisted of 1.49 meters, or 66 percent of the first.

The relative shifting of the points reveals an irregularity in the distribution of the change in the velocities of the individual electrodes in relation to the surface velocity and between the separate layers or levels of the ice strata. ("Application of Electrometry in Studying the Movement of Glaciers," by B. A. Borovinskiy and K. G. Makarevich; Alma-Ata, Vestnik Akademii Nauk Kazakhskoy SSR, No 7, Jul 59, pp 45-50)

V. ARCTIC AND ANTARCTIC

Fifth Antarctic Expedition Preparing To Leave

The diesel electric ship Ob' will leave Leningrad for the Antarctic early in November. It will be followed by a passenger-cargo ship. Both vessels will carry a total of about 160 members of the Fifth Antarctic Expedition.

In an interview with a correspondent of Vodnyy Transport, Ye. Treshnikov, deputy chief of the Main Administration of the Northern Sea Route, stated the following:

The Scientific Research Institute of the Arctic and Antarctic has worked out a detailed program of expedition activities. The Antarctic Committee under the Presidium of the Academy of Sciences USSR recently studied and approved this program.

Soviet scientists will be based at three stations, where they will conduct various types of research in vast regions of the continent for a period of about 14 months. The stations Mirnyy, Vostok, and Lazarev will continue investigations of the origin and thickness of the ice cover, the surface relief under the ice sheet, and other problems. Several special teams have already been staffed for making traverses into the interior of the continent.

The Fifth Expedition will devote much attention to the exploration of the mountains on Queen Maud Land. These mountains encircle the shore and rise up to 2 kilometers above the surface of the ice sheet. The expedition plans to work on the compilation of the first geological map of this large mountain area.

The Fifth Expedition will include participants from the German Democratic Republic and Czechoslovakia. Some scientists of the People's Republic of China may join the Soviet Expedition. Discussions are now being held with US and British scientists in the matter of having their representatives work at Soviet stations, and Soviet scientists at their stations.

The ships are expected to reach Antarctica about the end of December or the early part of January 1960.

The Fifth Antarctic Expedition is head by Ye. Korotkevich, Candidate of Geographical Sciences, who are chief of the geologicl and geographical detachment of the First Antarctic Expedition. It will also be the second Antarctic voyage for P. Sin'ko, head of the geophysical detachment; O. Krichak, head of the aerometeorological detachment;

and D. Aralov, head of the radio detachment. A. Pimenov, head of the aviation detachment, is making his first trip to the Antarctic. He is an experienced polar pilot. The expedition will have two new planes, an LI-2 and IL-14, and a MI-4 helicopter.

Eighteen Polish scientists will accompany the Soviet expedition to the Antarctic, where they will conduct research work at the former Soviet station Oazis, which has been transferred to the Polish scientists. Eleven of these will remain to winter at the station, and the rest will work there only during the summer months.

After leaving Mirnyy, the Ob' will sail to Bellingshausen Sea to conduct oceanographic research under the supervision of Prof I. Maksimov, who has been twice before in this region.

In addition to the three above-mentioned stations, where various kinds of research will be conducted, the expedition will organize two temporary stations early in 1960; one station will be south of station Lazarev, and the other one near the Australian base Mawson.

Preparations for the Fifth Antarctic Expedition are nearing completion. ("Fifth Antarctic Expedition Getting Ready to Leave," Moscow, Vodnyy Transport, 10 Sep 59)

Mirnyy Prepares for Interior Expeditions

During the Antarctic winter, the aviation detachment in Mirnyy was busy overhauling its equipment. The IL-12 and LI-2 were repaired and re-equipped. Six engines were replaced and the landing skis were reconditioned by recoating the stainless steel sheets with fluoroplastic, which makes it possible for the planes to take off at very low temperatures.

The gravimetric detachment, headed by S. Shcheglov, is getting ready for another interior expedition. The train will consist of two snow vehicles with trailers. Each snow vehicle will have a specially equipped platform for geodetic work. The work will be so organized that one observer will conduct the measurements on the platform of the "Pingvin," and the other one, stationed inside the vehicle, will record the data. They will be in contact through an intercom system. The gravimetric group will include the scientific associates Shcheglov, Khoman'ko, Ivanov, and Makarov. The special feature of this traverse will be the fact that, for the first time, the expedition members will conduct continuous, high-precision geodetic observations. Preparations for the traverse are fully completed and the party is waiting for favorable weather to leave Mirnyy.

Preparations are near completion for the trans-antarctic traverse which will be headed by A. Dralkin, chief of the Fourth Antarctic Expedition. Prof Savel'yev is to be the scientific leader of the traverse. The departure is scheduled for the second half of September. Complex scientific observations will be conducted on the trans-Antarctic traverse in the central regions of Antarctica, along the route Komsomol'skaya--Vostok --South Geographic Pole--Pole of Relative Inaccessibility--Station Lazarev. No observations will be conducted in the sector between Mirnyy and Komsomol'skaya, since this region has been investigated thoroughly by three preceding expeditions. All scientific work to be done on this traverse will be subordinated to the solution of one basic glaciological problem: the present ice sheet of Antarctica and its dynamics. The glaciers of Antarctica, which occupy about 14 million square kilometers, represent a huge cold storage. They have a great influence on the formation of climate and the hydrological regime of large areas of the Earth. During this traverse, observations will also be made to gain more precise information on the relief of the subglacial bed.

The glaciological team is divided into two groups. One group, consisting of Kapitsa, Kazarin, and Khrushchev, will leave earlier, together with an auxiliary detachment. The second group, consisting of Savel'yev, Durynin, Ukhov, and Krasnushkin, will join the traverse party at the station Komsomol'skaya, to which it will be flown by plane.

Scientific research in Antarctica is conducted in close cooperation with many foreign Antarctic expeditions. The Soviet geophysical detachment frequently exchanges information with the US stations of McMurdo, Scott Base, and Byrd; the British station Hallett; the French station on Adelie Land; the Japanese station Showa; and the Australian station Wilkes. The aerometeorological detachment exchanges information with the Australian stations Mawson, Davis, and Wilkes; the French station Dumont d'Urville; and the US station McMurdo. ("Spring in Mirnyy," Moscow, Vodnyy Transport, 15 Sep 59)

Results of Research Work in Antarctica

Research work in Antarctica was done in accordance with the IGY program at the Mirnyy observatory, at the interior stations of Pionerskaya, Komsomol'skaya, Vostok, Sovetskaya, Pole of Inaccessibility, and at the Oazis coastal station. In addition to stationary observations, extensive research work was conducted during sled-tractor expeditions and flights into the interior of the continent, as well as during marine expeditions.

The Soviet Antarctic expeditions have worked in close contact with scientists of other countries, exchanging visits and research materials and information.

The Presidium of the Academy of Sciences USSR noted the unselfish work of expedition members under the most difficult conditions and the great scientific value of their research. Sufficient material has been assembled for the compilation of the first hypsometric map of a considerable portion of East Antarctica. Important geographical discoveries have been made in central regions of the continent and along the coast. Several thousand kilometers of the Antarctic ice sheet have been explored, and it has been established that the central portion of the continent is occupied by a large subglacial mountainous region extending for more that 1,000 kilometers. The theory that East Antarctica is an archipelago covered by a single ice sheet has been refuted. Seismic and gravimetric studies have revealed the general nature of the regional continental anomaly of the Earth's gravity. On the basis of these data, a preliminary conclusion was drawn as to the general lowering of East Antarctica. A large amount of scientific material on the crystalline foundation of the East Antarctic platform was collected. A map of the mean annual isotherms of East Antarctica was compiled, and a new Cold Pole of the Earth (in the region of Station Vostok) was established.

Important information on the climate of central regions of Antarctica has been obtained. Climatic zones of Antarctica have been determined, and paths of Antarctic cyclones have been traced. It has been established that the more intensive atmospheric circulation in the Southern Hemisphere influences the atmospheric circulation in the Northern hemisphere. The extensive materials collected by Soviet scientists on measurements of atmospheric electricity, observations of the behavior of the Earth's magnetic field, the ionosphere, cosmic rays, night airglow, and other phenomena have helped considerably in discovering the nature of many geophysical processes in Antarctica, as well as on the entire globe.

An especially valuable phase in the work of the Third Continental Antarctic Expedition was the glaciological research done on the route between Mirnyy and the Pole of Relative Inaccessibility (a distance of over 2,100 kilometers) and the organization of a temporary station in this region.

The Presidium of the Academy of Sciences USSR acknowledged the successful fulfillment of the Soviet Union's obligations in regard to the IGY in the field of Antarctic exploration and obliged the heads of scientific institutions of the Academy of Sciences USSR, participating in Antarctic research to complete during 1959 the basic part of the primary processing of materials collected by the first, second, and third expeditions.

The Bureau of Geological-Geographical and Physico mathematical Departments was authorized to render the necessary aid to the institutes in speeding up the processing of these materials.

The Presidium approved the general direction of activities in the study of Antarctica during 1959-1965 and provided for measures to be taken in expediting the publication of scientific works of the expeditions. ("Results of Scientific Work in the Antarctic," Moscow, Vestnik Akademii Nauk SSSR, No 8, Aug 59)

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